



# DECUS

## PROGRAM LIBRARY

DECUS NO. 8-308

TITLE PDP-8 MORSE CODE SENDER

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SOURCE LANGUAGE PAL III



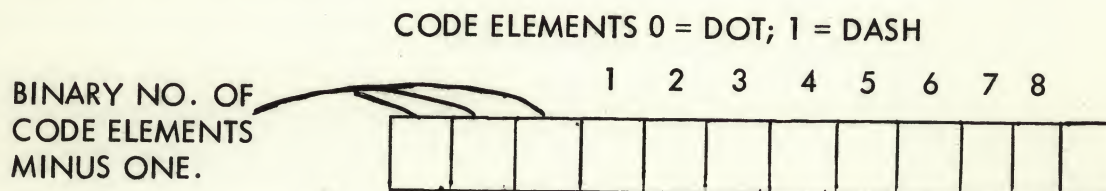
## STORAGE

6000 - 6347 (octal)

## DESCRIPTION

The program reads input from the ASR keyboard or tape reader and translates all valid characters into Morse code. Output in the form of a square audio wave is taken from D to A converter #1 and fed into an audio amplifier. Invalid input characters are ignored by the program.

Translation into Morse code is by a table look-up method. Each character is coded into a single computer word as illustrated below:



Determination of the validity of an input character is also accomplished by table look-up. The code speed is variable over its entire useful range.

## HARDWARE

4K PDP-8, D to A converter, audio amplifier with speaker.

## RESTRICTIONS

There is no input buffer in the program. Keyboard input must not be at a faster rate than code output.

## OPERATION

Load with the binary loader. Starting address is 6000. The code speed is determined by the setting of the switch register and may be changed at any time.

The valid input characters are:

A thru Z	← (error)
0 thru 9	↑ (understood )
. , ? - ( ) ; : " ' /	! (attention)
+ (double dash)	. (space)
@ (end of message)	(line feed)
\$ (end of work )	(carriage return)
# (wait)	

A carriage return-line feed combination is timed as a space. The output audio frequency may be changed by changing the contents of address 6150. A different D to A converter may be selected by the appropriate output command in address 6120.



		DAL=6551 /D-A #1
		NEG=7330 /SET AC=4000
		*6000 /START ADR
6000	6032	KCC /CLEAR FLAGS
6001	6046	TLS
6002	7300	ST, CLA CLL /READ INPUT CHARACTER
6003	6031	KSF
6004	5203	JMP .-1
6005	6036	KRB
6006	3337	DCA TEMP
6007	1340	TAD STEST /BEGINNING OF VALID CHARACTER TABLE
6010	3346	DCA CHAR
6011	7300	CHECK, CLA CLL
6012	1746	TAD I CHAR /FROM "VALID" TABLE
6013	2346	ISZ CHAR
6014	7450	SNA /END OF TABLE?
6015	5202	JMP ST /YES, TRY ANOTHER INPUT
6016	7041	CIA
6017	1337	TAD TEMP
6020	7440	SZA /INPUT VALID?
6021	5211	JMP CHECK /NO, TRY NEXT ON LIST
6022	1337	TAD TEMP /YES, ECHO
6023	6041	TSF
6024	5223	JMP .-1
6025	6046	TLS
6026	1341	TAD MODIFY
6027	3346	DCA CHAR
6030	3337	DCA TEMP
6031	1346	TAD CHAR
6032	1342	TAD SP /SPACE?
6033	7650	SNA CLA
6034	5277	JMP SPACE
6035	1346	TAD CHAR
6036	1343	TAD LF /LINE FEED?
6037	7650	SNA CLA
6040	5300	JMP LINF
6041	1346	TAD CHAR
6042	1344	TAD CR /CAR RET?
6043	7650	SNA CLA
6044	5302	JMP CARET
6045	7100	CLL
6046	1746	TAD I CHAR /GET DATA FROM TABLE
6047	3346	DCA CHAR
6050	4327	JMS ROT /DETERMINE # OF CODE ELEMENTS
6051	4327	JMS ROT
6052	4327	JMS ROT
6053	1337	TAD TEMP
6054	7040	CMA
6055	3337	DCA TEMP
6056	7300	NEXT, CLA CLL /DOT OR DASH?
6057	1346	TAD CHAR

6060	7004	RAL
6061	3346	DCA CHAR
6062	1211	TAD CHECK
6063	3310	DCA AGAIN
6064	7420	SNL /SKP IF DASH
6065	5270	JMP DOT
6066	4304	JMS COUNT
6067	4304	JMS COUNT
6070	4304	DOT, JMS COUNT
6071	1312	TAD INST
6072	3310	DCA AGAIN
6073	4304	JMS COUNT /SEND A SPACE
6074	2337	ISZ TEMP /LAST ELEMENT FOR INPUT?
6075	5256	JMP NEXT /SEND MORE
6076	5301	JMP WDSP /SEND MORE SPACE & GET NEW INPUT
6077	4304	SPACE, JMS COUNT
6100	4304	LINF, JMS COUNT
6101	4304	WDSP, JMS COUNT
6102	4304	CARET, JMS COUNT
6103	5202	JMP ST
6104	0000	COUNT, 0000
6105	7604	LAS /GET SENDING SPEED
6106	7040	CMA
6107	3345	DCA CLOCK
6110	0000	AGAIN, 0000 /SEND IF CLA, SPACE IF NEG
6111	4317	JMS CONV
6112	7330	INST, NEG
6113	4317	JMS CONV
6114	2345	ISZ CLOCK
6115	5310	JMP AGAIN
6116	5704	JMP I COUNT
6117	0000	CONV, 0000
6120	6551	DAL
6121	7300	CLA CLL
6122	1350	TAD PITCH
6123	3347	DCA DELAY
6124	2347	ISZ DELAY
6125	5324	JMP .-1
6126	5717	JMP I CONV
6127	0000	ROT, 0000
6130	1346	TAD CHAR
6131	7004	RAL
6132	3346	DCA CHAR
6133	1337	TAD TEMP
6134	7004	RAL
6135	3337	DCA TEMP
6136	5727	JMP I ROT
6137	0000	TEMP, 0000
6140	6156	STEST, 6156
6141	6010	MODIFY, 6010
6142	1530	SP, 1530
6143	1556	LF, 1556



6144	1553	CR, 1553
6145	<del>0000</del>	CLOCK, <del>0000</del>
6146	<del>0000</del>	CHAR, <del>0000</del>
6147	<del>0000</del>	DELAY, <del>0000</del>
6150	7464	PITCH, 7464
*6156 /START OF "VALID" TABLE		
6156	<del>0301</del>	301
6157	<del>0302</del>	302
6160	<del>0303</del>	303
6161	<del>0304</del>	304
6162	0305	305
6163	<del>0306</del>	306
6164	<del>0307</del>	307
6165	<del>0310</del>	310
6166	<del>0311</del>	311
6167	<del>0312</del>	312
6170	<del>0313</del>	313
6171	<del>0314</del>	314
6172	<del>0315</del>	315
6173	<del>0316</del>	316
6174	<del>0317</del>	317
6175	<del>0320</del>	320
6176	<del>0321</del>	321
6177	<del>0322</del>	322
6200	<del>0323</del>	323
6201	<del>0324</del>	324
6202	<del>0325</del>	325
6203	<del>0326</del>	326
6204	<del>0327</del>	327
6205	<del>0330</del>	330
6206	<del>0331</del>	331
6207	<del>0332</del>	332
6210	<del>0260</del>	260
6211	<del>0261</del>	261
6212	<del>0262</del>	262
6213	<del>0263</del>	263
6214	<del>0264</del>	264
6215	<del>0265</del>	265
6216	<del>0266</del>	266
6217	<del>0267</del>	267
6220	<del>0270</del>	270
6221	<del>0271</del>	271
6222	<del>0256</del>	256
6223	<del>0254</del>	254
6224	<del>0277</del>	277
6225	<del>0253</del>	253
6226	<del>0300</del>	300
6227	<del>0244</del>	244
6230	<del>0243</del>	243
6231	<del>0241</del>	241

6232	Ø336	336
6233	Ø257	257
6234	Ø247	247
6235	Ø255	255
6236	Ø25Ø	25Ø
6237	Ø251	251
624Ø	Ø272	272
6241	Ø273	273
6242	Ø242	242
6243	Ø337	337
6244	Ø212	212
6245	Ø215	215
6246	Ø24Ø	24Ø
6247	ØØØØ	ØØØ /END OF VALID TABLE
625Ø	ØØØØ	ØØØ
6251	452Ø	452Ø /START DATA TABLE
6252	522Ø	522Ø
6253	42ØØ	42ØØ
6254	5Ø5Ø	5Ø5Ø
	*6257	
6257	536Ø	536Ø
626Ø	555Ø	555Ø
6261	555Ø	555Ø
6262	ØØØØ	ØØØØ
6263	442Ø	442Ø
6264	563Ø	563Ø
6265	541Ø	541Ø
6266	525Ø	525Ø
6267	444Ø	444Ø
627Ø	476Ø	476Ø
6271	436Ø	436Ø
6272	416Ø	416Ø
6273	4Ø6Ø	4Ø6Ø
6274	4Ø2Ø	4Ø2Ø
6275	4ØØØ	4ØØØ
6276	44ØØ	44ØØ
6277	46ØØ	46ØØ
63ØØ	47ØØ	47ØØ
63Ø1	474Ø	474Ø
63Ø2	57ØØ	57ØØ
63Ø3	552Ø	552Ø
	*63Ø7	
63Ø7	514Ø	514Ø
631Ø	424Ø	424Ø
6311	12ØØ	12ØØ
6312	34ØØ	34ØØ
6313	35ØØ	35ØØ
6314	24ØØ	24ØØ
6315	ØØØØ	ØØØØ



6316	3100	3100
6317	2600	2600
6320	3000	3000
6321	1000	1000
6322	3340	3340
6323	2500	2500
6324	3200	3200
6325	1600	1600
6326	1400	1400
6327	2700	2700
6330	3300	3300
6331	3640	3640
6332	2200	2200
6333	2000	2000
6334	0400	0400
6335	2100	2100
6336	3040	3040
6337	2300	2300
6340	3440	3440
6341	3540	3540
6342	3600	3600
	*6346	
6346	4040	4040
6347	7000	7000

AGAIN	6110
CARET	6102
CHAR	6146
CHECK	6011
CLOCK	6145
CONV	6117
COUNT	6104
CR	6144
DAL	6551
DELAY	6147
DOT	6070
INST	6112
LF	6143
LINF	6100
MODIFY	6141
NEG	7330
NEXT	6056
PITCH	6150
ROT	6127
SP	6142
SPACE	6077
ST	6002
STEST	6140
TEMP	6137
WDSP	6101

